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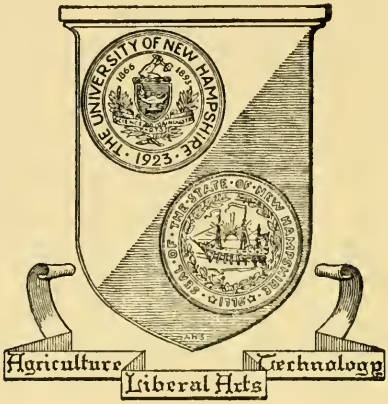

The University
of
New Hampshire

Bulletin 336 November, 1941

THE UNIVERSITY OF NEW HAMPSHIRE
AGRICULTURAL EXPERIMENT STATION
DEPARTMENT OF AGRICULTURAL AND BIOLOGICAL CHEMISTRY

Inspection of Commercial Fertilizers for 1941

MADE FOR THE
STATE DEPARTMENT OF AGRICULTURE

T. O. Smith and H. A. Davis

THE UNIVERSITY OF NEW HAMPSHIRE
DURHAM, N. H.

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INSPECTION OF COMMERCIAL FERTILIZERS

MADE FOR THE STATE DEPARTMENT OF AGRICULTURE

The inspection of commercial fertilizers reported in this bulletin was made under the direction of the Honorable Andrew L. Felker, Commissioner of Agriculture. The state inspector, Mr. Eugene D. Sanborn, collected samples of 108 brands of fertilizer and fertilizer materials which were offered for sale by dealers or had been delivered to consumers during the year ending June, 1941. The general character of the brands sampled is shown by the following classification:

Complete fertilizer	86
Phosphoric acid and potash	2
Superphosphate	5
Nitrate of soda	2
Cyanamid	1
Muriate of potash	1
Ground bone	4
Natural manures	7

THE FERTILIZER LAW

The purchaser of a fertilizer should familiarize himself with the full text of the fertilizer law. He should not accept from the dealer any bag of fertilizer which is not tagged and guaranteed in compliance with the law. The law governing these matters is as follows:

"Every lot or parcel of commercial fertilizer or fertilizer material sold or offered or exposed for sale within this state shall be accompanied by a plainly printed statement, clearly and truly certifying the number of net pounds of fertilizer in the package; the name, brand or trademark under which the fertilizer is sold; the name

and address of the manufacturer or importer; the location of the factory; and a chemical analysis stating the minimum percentage of nitrogen, of available phosphoric acid and of water soluble potash expressed in whole numbers.

"No fertilizer or fertilizer material containing the three essential fertilizing elements, nitrogen, phosphoric acid and potash may be sold or offered for sale if the total minimum plant food nutrients contained therein is less than fourteen per cent by weight, provided however that natural animal and bird manures shall be excepted from the provisions of this section."

The state official charged with the enforcement of the fertilizer law is the Commissioner of Agriculture. Copies of the full text of the law may be obtained from his office in Concord. All inquiries concerning the law and all matters relative to the registration of brands should be addressed to his office.

The chief purpose of the official inspection required by the fertilizer law is to protect the consumer against the misbranded products which would doubtless soon appear on the market if the sale of fertilizer was not under state regulation. The value of a fertilizer depends mainly upon its content of available plant food, particularly nitrogen, phosphoric acid and potash. The presence of these constituents can only be determined by a chemical analysis. To insure that they are being furnished by all manufacturers in the guaranteed amounts, it is considered necessary that each brand of fertilizer offered for sale be officially inspected and analyzed one or more times each year. When failure to meet the guarantee is proven by chemical analysis, the prosecution or seizure provisions of the law may be invoked. The purchaser's refusal to buy a fertilizer which does not conform to the law in every respect will not only assist in the enforcement of the law but will at the same time insure himself

the protection of the law. If the buyer fails to assure himself the legal requirements have been met, he accepts the fertilizer at his own risk.

All samples reported in this bulletin were drawn by an inspector appointed by the Commissioner of Agriculture. The chemical analyses were made by the methods of the Association of Official Agricultural Chemists.

TABLE 1. COMPLETE FERTILIZERS ANALYZED IN 1941.

Formula	Number of brands	Average per cent nitrogen	Average per cent available phosphoric acid	Average per cent water-soluble potash	Average retail price per ton
3—10—4	5	3.20	9.92	4.28	32.95
3—10—6	1	3.00	10.16	6.00	35.00
3—12—6	2	3.43	12.09	6.32	35.86
4—8—4	7	4.08	8.33	4.31	36.15
4—8—7	2	4.15	8.28	7.98	34.29
4—8—10	10	4.08	8.36	10.15	39.40
4—12—4	3	4.14	12.04	4.35	42.50
4—16—20	2	4.54	17.11	18.92	46.26
5—7—3	1	5.50	4.80	4.60	115.00
5—8—7	11	5.13	8.10	7.35	39.72
5—8—10	2	4.65	9.26	9.27	40.00
5—10—5	2	4.92	10.66	5.29	34.10
5—10—10	3	5.15	10.16	10.17	35.90
5—15—5	1	5.24	15.52	5.76	32.60
6—12—12	1	6.10	12.17	12.21	——
7—5—3	1	7.02	5.04	3.09	75.00
7—6—6	2	6.86	6.37	6.14	41.77
7—7—5	1	7.02	7.49	5.09	42.55
7—7—7	6	7.15	7.58	6.86	41.19
7—14—21	1	7.10	14.05	22.43	45.80
8—5—2	2	7.98	5.91	2.63	68.00
8—5—5	1	8.73	6.64	7.42	55.50
8—6—2	2	8.36	6.73	2.58	64.00
8—16—8	1	8.01	16.59	8.43	41.20
8—16—14	6	7.96	16.18	14.32	55.62
8—16—16	5	8.02	16.53	15.45	47.16
8—16—20	2	7.77	16.08	19.69	59.20
8—24—8	1	8.26	24.22	9.01	46.80
10—5—5	1	10.06	6.24	5.89	37.60
10—10—10	1	10.13	10.19	10.35	44.80

In Table I are tabulated the grades of complete fertilizers analyzed in this year's inspection, the number of brands sampled by the inspector in each grade, the average per cent of nitrogen, of available prosphoric acid, and of water soluble potash and the average retail price per ton.

CONFORMITY TO GUARANTEE

Sixty-four of the 108 brands analyzed equalled or exceeded the manufacturer's guarantee. No brand failed to meet the guarantee in all of the three constituents, total nitrogen, available phosphoric acid and water soluble potash. Eight brands were below guarantee in two of the three constituents, four in nitrogen and available phosphoric acid, and four in nitrogen and potash. Thirty-six brands failed to meet the guarantee in only one constituent.

Including all the brands referred to above, 19 brands were found to contain less than the guaranteed amount of nitrogen. The greatest deficiency was 0.77 per cent. The average of the other 18 deficiencies was 0.22 per cent. Eleven brands failed to meet the guarantee in available phosphoric acid. One brand was deficient 2.20 per cent. The average of the other 10 deficiencies was 0.54 per cent. Nineteen brands contained less potash than was guaranteed. The greatest deficiency was 2.35 per cent. The average of the other 18 deficiencies was 0.70 per cent.

Fifteen brands were guaranteed to contain magnesium oxide. All fully met the guarantee.

In the tabulation of the analyses in the following pages deficiencies of one-fourth of one per cent or more are shown in bold face type. The manufacturers are arranged alphabetically. The brand name is listed alphabetically or numerically by formula under the manufacturer.

	Nitrogen		Phosphoric Acid				Potash		Magnesium Oxide	
			Total		Available					
	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found
American Agricultural, Chemical Co. North Weymouth, Mass.										
AA 3-10-4 Corn Favorite	3.00	2.90	.....	11.14	10.00	10.02	4.00	*3.60*	.....	.....
AA 4-8-4 Market Garden Fertilizer	4.00	3.86	.....	8.78	8.00	8.18	4.00	4.35	.....	.....
AA 4-8-7 Peerless Fertilizer	4.00	4.02	.....	9.24	8.00	8.56	7.00	8.93	.....	.....
AA 4-8-10 Potato and Root Crop Fertilizer	4.00	4.09	.....	8.53	8.00	8.00	10.00	*9.45*	.....	.....
AA 5-8-7 Potato and Vegetable Fertilizer	5.00	5.35	.....	8.42	8.00	8.00	7.00	7.03	.....	.....
AA 7-7-7 Top Dresser	7.00	7.42	.....	7.77	7.00	7.25	7.00	*6.37*	.....	.....
AA 8-16-14 Double Strength Fertilizer	8.00	7.89	.....	17.31	16.00	16.91	14.00	14.88	.....	.....
AA 8-16-16 Fertilizer	8.00	8.00	.....	17.97	16.00	17.61	16.00	*13.65*	.....	.....
AA 16% Superphosphate	.....	.....	.....	16.98	16.00	16.40	.....	.....	.....	.....
Agrico 3-10-6 for Corn	3.00	3.00	.....	11.02	10.00	10.16	6.00	6.00	.....	.....
Agrico 4-8-10 for New England	4.00	4.03	.....	8.69	8.00	8.16	10.00	10.32	.....	.....
Agrico 4-16-20 for Seeding Down	4.00	4.59	.....	17.49	16.00	16.85	20.00	*18.81*	.....	.....
Agrico 5-8-7 for Potatoes and Vegetables	5.00	4.81	.....	8.43	8.00	*7.49*	7.00	7.30	.....	.....
Agrico 5-8-10 for Aroostook with 10% Potash	5.00	*4.23*	.....	10.40	8.00	10.02	10.00	*8.92*	.....	.....
Agrico 7-7-5 for Lawns, Trees and Shrubs	7.00	7.02	.....	7.85	7.00	7.49	5.00	5.09	.....	.....
Agrico 7-7-7 for Top Dressing	7.00	7.11	.....	8.20	7.00	7.79	7.00	*5.69*	.....	.....
Agrico 8-6-2 Country Club Fertilizer	8.00	*7.70*	.....	7.36	6.00	6.88	2.00	2.71	.....	.....
Agrico 8-16-14 for Potatoes Double Strength	8.00	8.03	.....	16.37	16.00	16.04	14.00	14.41	.....	.....
Agrico 8-16-20 for Potatoes Double Strength	8.00	8.08	.....	17.38	16.00	16.70	20.00	*19.22*	.....	.....
Fine Ground Bone	2.47	2.65	23.00	26.70	.....	13.38	.....	.....	.....	.....

	Nitrogen		Phosphoric Acid				Potash		Magnesium Oxide	
			Total		Available					
	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found
American Cynamid Co. New York, N. Y.										
21% Aero Cyanamid Granular	21.00	21.61	.....	.....	.....	.....	.....	.....	.....	.....
Apothecaries Hall Co. Waterbury, Conn.										
Liberty Corn Fertilizer 3-12-6	3.00	3.41	.....	12.31	12.00	12.00	6.00	6.79	.....	.....
Liberty Fish, Bone and Potash 3-10-4	3.00	3.33	.....	10.50	10.00	10.02	4.00	4.57	.....	.....
Liberty High Grade Market Garden 5-8-7	5.00	5.18	.....	8.71	8.00	8.09	7.00	7.64	.....	.....
Liberty Market Garden Special 4-8-4	4.00	4.37	.....	8.52	8.00	8.32	4.00	4.42	.....	.....
Liberty Potato and General Crops 4-8-10	4.00	4.14	.....	8.67	8.00	8.27	10.00	10.34	.....	.....
Liberty Special Fertilizer for Fruit and Grass 7-7-7	7.00	7.02	.....	7.50	7.00	7.36	7.00	7.04	.....	.....
Armour Fertilizer Works Carteret, N. J.										
Armour's Big Crop Fertilizer 4-8-4	4.00	3.89	.....	8.54	8.00	8.26	4.00	4.09	.....	.....
Armour's Big Crop Fertilizer 4-8-10	4.00	3.80	.....	8.74	8.00	8.28	10.00	10.49	.....	.....
Armour's Big Crop Fertilizer 5-8-7	5.00	5.02	.....	8.47	8.00	8.00	7.00	7.01	.....	.....
Armour's Big Crop Fertilizer 5-10-10	5.00	5.00	.....	10.78	10.00	10.30	10.00	9.57	.....	.....

Armour's Putting Green Special Mixture 8-5-2	8.00	8.05	.....	6.22	5.00	5.62	2.00	2.87	.....	.....
Armour's Sheep and Goat Manure	1.25	1.35	1.00	1.46	.....	1.28	2.00	3.29	.....	.....
Atkins and Durbrow New York, N. Y.										
Improved Driconure 2-1-1	2.00	2.85	.....	2.29	1.00	2.13	1.00	1.69	.....	.....
Barrett Company New York, N. Y.										
Arcadian Nitrate of Soda	16.00	16.03	.....	.....	.....	.....	.....	.....	.....	.....
Berkshire Chemical Co. Bridgeport, Conn.										
Berkshire 4-8-4 Fertilizer	4.00	4.10	.....	8.70	8.00	8.16	4.00	4.85	.....	.....
Berkshire 4-8-10 Fertilizer	4.00	4.03	.....	8.35	8.00	*7.69*	10.00	10.69	.....	.....
Berkshire 5-8-7 Fertilizer	5.00	5.01	.....	8.56	8.00	8.04	7.00	7.02	.....	.....
Berkshire 7-7-7 Fertilizer	7.00	7.29	.....	7.62	7.00	7.10	7.00	7.15	.....	.....
Berkshire 8-5-2 Golf Green Fertilizer	8.00	7.91	.....	6.96	5.00	6.20	2.00	2.39	.....	.....
Berkshire 8-16-16 Fertilizer	8.00	8.00	.....	15.56	16.00	*15.40*	16.00	16.03	.....	.....
Buell Fertilizer Co. Exeter, N. H.										
Buell Peat-Poultry Manure	3.00	*2.45*	.....	1.49	3.00	*1.33*	1.50	1.71	.....	.....

	Nitrogen		Phosphoric Acid				Potash		Magnesium Oxide	
			Total		Available					
	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found
Chilean Nitrate Sales Corp. New York, N. Y.										
Chilean Nitrate of Soda Champion Brand	16.00	16.05	.....	.....	.....	.....	.....	.....	.....	.....
Consolidated Rendering Co. Boston, Mass.										
Competitive Brand 8-16-16	8.00	8.00	.....	17.36	16.00	17.04	16.00	*15.35*	.....	.....
Corenco 3-10-4 Animal Brand	3.00	3.20	.....	10.24	10.00	10.00	4.00	4.40	.....	.....
Corenco 4-8-4 Corn and Vegetable	4.00	4.05	.....	8.72	8.00	8.28	4.00	4.29	.....	.....
Corenco 4-8-10 Potato Grower	4.00	3.89	.....	9.27	8.00	9.05	10.00	10.01	.....	.....
Corenco 4-12-4 Complete Manure	4.00	4.17	.....	12.85	12.00	12.49	4.00	4.31	.....	.....
Corenco 5-8-7 General Crop Manure	5.00	5.00	.....	8.22	8.00	8.00	7.00	7.47	.....	.....
Corenco 5-8-10 Peerless Potato	5.00	5.07	.....	9.02	8.00	8.51	10.00	*9.59*	.....	.....
Corenco 8-16-14 Two in One	8.00	7.88	.....	15.33	16.00	*15.11*	14.00	14.94	.....	.....
Corenco Brand Superphosphate 16%	.....	.....	.....	19.24	16.00	17.77	.....	.....	.....	.....
Corenco Ground Bone	2.47	2.85	23.00	23.92	.....	12.07	.....	.....	.....	.....
Corenco Sheep Manure	1.25	1.65	1.00	*0.68*	.....	0.64	2.00	2.14	.....	.....
Davison Chemical Corp. Baltimore, Md.										
Daveo Granulated 20% Superphosphate	.....	.....	.....	21.67	20.00	21.05	.....	.....	.....	.....

Eastern States Farmers' Exchange, Springfield, Mass.											
Eastern States 0-20-20 Open Formula Fertilizer	.....	.....	.....	21.73	20.00	21.25	20.00	*18.63*	.....	.....
Eastern States 4-16-20 Open Formula Fertilizer	4.00	4.49	.....	18.51	16.00	17.37	20.00	*19.04*	1.00	1.67
Eastern States 5-10-5 Open Formula Fertilizer	5.00	5.04	.....	11.57	10.00	11.17	5.00	5.49	2.00	3.04
Eastern States 5-10-10 Open Formula Fertilizer	5.00	5.41	.....	10.83	10.00	10.17	10.00	10.93	1.00	2.32
Eastern States 5-15-5 Open Formula Fertilizer	5.00	5.24	.....	16.42	15.00	15.52	5.00	5.76	1.00	1.41
Eastern States 7-7-7 Open Formula Fertilizer	7.00	7.13	.....	8.97	7.00	8.69	7.00	7.86	2.00	3.62
Eastern States 7-14-21 Open Formula Fertilizer	7.00	7.10	.....	14.59	14.00	14.05	21.00	*22.43*	2.00	2.57
Eastern States 8-16-8 Open Formula Fertilizer	8.00	8.01	.....	17.31	16.00	16.59	8.00	8.43	1.00	2.25
Eastern States 8-16-16 Open Formula Fertilizer	8.00	8.23	.....	16.57	16.00	16.00	16.00	16.92	0.50	1.27
Eastern States 8-24-8 Open Formula Fertilizer	8.00	8.26	.....	25.10	24.00	24.22	8.00	9.01	1.00	1.96
Eastern States 10-5-5 Open Formula Fertilizer	10.00	10.06	.....	6.50	5.00	6.24	5.00	5.89	1.00	3.01
Eastern States 10-10-10 Open Formula Fertilizer	10.00	10.13	.....	10.39	10.00	10.19	10.00	10.35	1.00	1.92
Thomas W. Emerson Co., Boston, Mass.											
English Formula Lawn and Garden Dressing 5-7-3	5.00	5.50	.....	9.12	7.00	*4.80*	3.00	4.60	.....	.....
International Agricultural Corp., Woburn, Mass.											
Bone Meal	2.47	3.14	23.00	*22.68*	.....	12.31	.....	.....	.....	.....
Caribee Green and Fairway Fertilizer 7-5-3	7.00	7.02	.....	5.24	5.00	5.04	3.00	3.09	.....	.....
Caribee Market Garden Fertilizer 5-10-10	5.00	5.03	.....	10.54	10.00	10.00	10.00	10.02	2.00	2.93
International 0-20-20 Fertilizer	.....	.....	.....	20.23	20.00	20.13	20.00	21.23	.....	.....

	Nitrogen		Phosphoric Acid				Potash		Magnesium Oxide	
			Total		Available					
	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found	Guaranteed	Found
International 3-10-4 Fertilizer	3.00	3.14	.....	10.27	10.00	9.81	4.00	4.37	.....	.....
International 4-8-4 Fertilizer	4.00	4.08	.....	8.90	8.00	8.30	4.00	4.00	.....	.....
International 4-8-10 Fertilizer	4.00	4.28	.....	8.99	8.00	8.51	10.00	10.04	.....	.....
International 5-8-7 Fertilizer	5.00	5.39	.....	9.03	8.00	8.03	7.00	7.21	.....	.....
International 6-12-12 Fertilizer	6.00	6.10	.....	12.68	12.00	12.17	12.00	12.21	2.00	2.68
International 7-6-6 Fertilizer	7.00	*6.63*	.....	7.10	6.00	6.69	6.00	6.79	.....	.....
International 8-16-14 Fertilizer	8.00	8.00	.....	17.34	16.00	16.74	14.00	*13.67*	2.00	2.57
International 8-16-16 Fertilizer	8.00	7.87	.....	16.98	16.00	16.62	16.00	*15.30*	2.00	2.46
International Caribee Sheep Manure	1.25	1.90	1.00	1.13	0.75	1.05	2.00	3.47	.....	.....
International 16% Superphosphate	.....	.....	.....	17.12	16.00	16.68	.....	.....	.....	.....
International Granular 20% Superphosphate	.....	.....	.....	21.55	20.00	21.23	.....	.....	.....	.....
Merrimack Farmers' Exchange Concord, N. H.										
Merrimack Brand 4-8-10	4.00	4.12	.....	9.23	8.00	8.75	10.00	*9.51*	.....	.....
Merrimack Brand 4-12-4	4.00	4.03	.....	12.67	12.00	*11.63*	4.00	4.41	.....	.....
Merrimack Brand 5-8-7	5.00	5.27	.....	8.90	8.00	8.52	7.00	7.05	.....	.....
Merrimack Brand 5-10-5	5.00	4.81	.....	10.50	10.00	10.16	5.00	5.08	.....	.....
Merrimack Brand 7-7-7 Top Dressing	7.00	6.95	.....	7.62	7.00	7.26	7.00	7.05	.....	.....
Merrimack Brand 8-16-14	8.00	*7.72*	.....	16.55	16.00	16.39	14.00	14.00	.....	.....
Merrimack Brand 8-16-20	8.00	*7.46*	.....	15.69	16.00	*15.46*	20.00	20.16	.....	.....

Profile Fertilizer Co. Manchester, N. H.										
Profile Sheep Fertilizer	1.53	2.04	0.37	0.26	0.34	0.20	3.00	3.04	.....	.....
Rogers & Hubbard Co. Portland, Conn.										
Hubbard's Corn and Grain Fertilizer 3-10-4	3.00	3.45	.....	10.60	10.00	9.76	4.00	4.48	.....	.....
Hubbard's Golf Course Fertilizer 8-6-2	8.00	9.03	.....	7.14	6.00	6.58	2.00	2.45	.....	.....
Hubbard's High Potash Fertilizer 4-8-10	4.00	4.32	.....	8.86	8.00	8.36	10.00	10.32	.....	.....
Hubbard's Potato Fertilizer 5-8-7	5.00	5.18	.....	9.08	8.00	8.56	7.00	8.21	.....	.....
Hubbard's Top Dressing 8-5-8	8.00	8.73	8.00	8.16	5.00	6.64	8.00	*7.42*	.....	.....
Muriate Potash 50%	.....	.....	.....	.....	.....	.....	50.00	50.05	.....	.....
Red H Brand 3-12-6	3.00	3.46	.....	12.53	12.00	12.19	6.00	5.86	.....	.....
Red H Brand 4-8-4	4.00	4.21	.....	9.27	8.00	8.81	4.00	4.20	.....	.....
Red H Brand 4-8-7	4.00	4.28	.....	8.87	8.00	8.00	7.00	7.03	.....	.....
Red H Brand 4-8-10	4.00	4.12	.....	8.90	8.00	8.50	10.00	10.36	.....	.....
Red H Brand 5-8-7	5.00	5.24	.....	8.66	8.00	8.38	7.00	7.67	.....	.....
Red H Brand 7-0-0	7.00	7.09	.....	6.23	6.00	6.05	6.00	*5.50*	.....	.....
Red H Brand 8-16-14	8.00	8.21	.....	16.20	16.00	15.89	14.00	14.00	.....	.....
Swift & Company Fertilizer Works Baltimore, Md.										
Bone Meal Fertilizer	2.47	2.50	23.00	26.25	.....	7.15	.....	.....	.....	.....
Roselawn Special Plant Food 5-8-7	5.00	5.01	.....	8.54	8.00	8.00	7.00	7.27	.....	.....
Swift's Pulverized Sheep Manure	1.85	2.10	1.00	1.56	.....	1.42	1.75	2.96	.....	.....
Vigoro Complete Plant Food	4.00	4.21	.....	12.80	12.00	12.00	4.00	4.32	.....	.....